

### **Lake Foam – Natural or Caused by Laundry Detergent?**

Lakeshore property owners are often concerned when foam appears on their beach or they observe large patches of foam on the lake. However, most foam observed in lakes and streams is a product of nature; foam is not necessarily an indicator of pollution. Small trout streams, for example, often have naturally occurring pools of foam where fish will hide.

#### **What causes the foaming of surface waters on lakes?**

The foaming of surface waters on lakes is not a new phenomenon. It is a natural process that has been going on for a long time. Foam is created when the surface tension of water (attraction of surface molecules for each other) is reduced and the air is mixed in, forming bubbles. Man-made agents can also reduce surface tension.



All lakes contain organic matter, such as algae and plants, and when these decompose they release cellular products (surfactants) into the water, reducing the surface tension. Windy conditions result in waves that agitate this surface agent, thus transforming it into sudsy white foam. Currents and boats also mix air with the organic compounds present in the lake to produce foam.

During the 1950s through the 1970s, many communities experienced unnatural foam problems in waterbodies. This foam was caused by synthetic laundry detergents that were highly resistant to chemical breakdown and were only slowly degradable (broken down by bacteria). New Hampshire now makes it mandatory that all cleaning products sold in the state must be biodegradable and phosphate-free. Only automatic dish detergent is exempt from the phosphate-free requirement. A material is considered biodegradable if it a “material that, left to itself, will be decomposed by natural processes.”

**Where is lake foam found and what does it look like?**

The foam will frequently form parallel streaks in the open water, caused by wind-induced surface currents. It will also collect in large quantities on windward shores, coves, or in eddies. Natural foam has a somewhat earthy fishy aroma and may have an off-white, tan, or brown color. Detergent foam in contrast will have a noticeable perfume smell, and is usually whiter in color.

**Testing Lake Foam: Is it from natural sources or laundry detergent?**

Optical brighteners, dyes used to make clothes appear whiter and brighter, are found in most laundry detergents used in the United States. Although optical brighteners are not actually harmful to the water itself, their presence in surface waters indicates that there is laundry detergent seepage into the water. This could mean that wastewater flowing into the waterbody is being inadequately treated, possibly due to a failing septic system or a complete lack of a wastewater treatment system altogether. Untreated wastewater may not only contain optical brighteners, but pollutants from the home such as phosphorus and nitrogen and household cleaning chemicals.

If you suspect that laundry detergent may be leaking into a surface water, there are two DES-approved sampling procedures you can follow to determine if optical brighteners are present in the water, as follows:

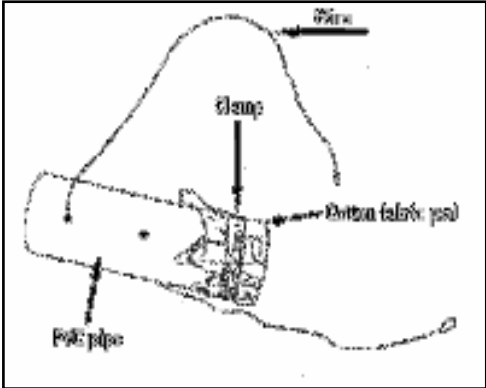
**Procedure 1: Simple foam collection and analysis**

If you observe foam along the shoreline or in a tributary, simply fill a clean jar with the foam and surface water and submit it to the DES Limnology Center for an optical brighteners test. In the Limnology Center, a biologist will soak an untreated cotton pad in the sample and then will place the cotton sample, a standard, and a blank under a black light. If the cotton pad with the sample fluoresces, this indicates that optical brighteners are present in the surface water. It is important to point out that the cotton pads used in this procedure are specially obtained to assure that they have not been in contact with any detergents or optical brighteners.

This is the simplest and quickest procedure to test for optical brighteners in a surface water; however, this method may not accurately depict the conditions in the stream if the concentration of optical brighteners is exceptionally dilute, or laundry detergent is flowing into the waterbody but foam is not present.

**Procedure 2: Prolonged exposure**

This option requires you to immerse untreated cotton pads in stream along the shoreline for an extended period of time. This will provide the cotton the greatest potential to absorb optical brighteners that may be leaching into the surface water without producing foam or may be leaching into the water during times when you are not able to observe the presence of foam. This method is most suitable for streams, storm drains, pipes, and catch basins.

1. Obtain a supply of untreated cotton and laboratory gloves. You can acquire these items via VWR Graphics (856-467-2600) or by contacting the VLAP Coordinator (603-271-2658). You must wear gloves whenever you handle the cotton. **Do not touch the cotton with your bare fingers and do not let the cotton brush up against your clothes.**
2. Once you have obtained the appropriate cotton, you will need to construct or obtain a simple trap to hold the cotton in place while in the water. This can be made with a PVC pipe that is two inches in diameter and approximately six to eight inches long, or by obtaining a rigid plastic cage. If using a PVC pipe, stretch the cotton across one end of the pipe to the other and then secure it with a rubber band or metal clamp. If using a plastic cage, make sure that the holes in the cage are small enough so that the cotton will not escape. **(Again, please remember to wear gloves while handling the cotton and do not let it touch your clothes!)**
3. Attach a wire or fishing line to the pipe or plastic cage. This will hold the trap in place at the testing site. It can be tied to a rock, branch, roots, dock, or anything else at the site that will keep it fixed. If using a pipe, the end of the pipe with cotton on it should be facing upstream against the direction of flow, and it should not be touching the bottom of the stream.
4. Keep the cotton in the waterbody for seven days.
5. After seven days, put on sterile gloves (make sure these gloves have not been in contact with laundry detergent!) and remove the cotton. If there is any sediment on the cotton, simply rinse the cotton in the surface water. Place the cotton in a plastic bag (making sure to keep it out of direct sunlight), and bring it to the DES Limnology Center as soon as possible for testing.

### Additional Questions

If you have any additional questions about lake foam, or the optical brighteners sampling procedures, please do not hesitate to contact the VLAP Coordinator, at (603) 271-2658.

#### Sources:

[www.epa.gov/owow/monitoring/volunteer/newsletter/volmon11no2.pdf](http://www.epa.gov/owow/monitoring/volunteer/newsletter/volmon11no2.pdf)  
[www.longwood.edu/cleanva/images/Sec5.opticalbrightlession.pdf](http://www.longwood.edu/cleanva/images/Sec5.opticalbrightlession.pdf)